

DRAFT

Water Right Decision 1630

SAN FRANCISCO BAY/
SACRAMENTO - SAN JOAQUIN
DELTA ESTUARY

DECEMBER 1992

STATE WATER RESOURCES CONTROL BOARD
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS

A) MUNICIPAL AND INDUSTRIAL USES

LOCATION	SAMPLING SITE NOs. (I-A/B/K)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
Salinity:							
Contra Costa Canal at Pumping Plant #1	C-5 CHCCC06	Chloride (Cl-)	Maximum mean daily, in mg/l	N/A	All	Oct-Sep	250
Contra Costa Canal at Pumping Plant #1 - or - San Joaquin River at Antioch Water Works Intake	C-5 CHCCC06 D-12(near) RSAN007	Chloride (Cl-)	Maximum mean daily 150 mg/l chloride for at least the number of days shown during the Water Year. Must be provided in intervals of not less than two weeks duration. (Percentage of Water Year shown in parenthesis).	Sac. R. ¹	W AN BN D C	No. of days each Water Year < 150 mg/l Cl- 240 (66%) 190 (52%) 175 (48%) 165 (45%) 155 (42%)	
West Canal at mouth of Clifton Court Forebay	C-9 CHWST0	Chloride (Cl-)	Maximum mean daily, in mg/l	N/A	All	Oct-Sep	250
Delta Mendota Canal at Tracy Pumping Plant	DMC-1 CHDMC004	Chloride (Cl-)	Maximum mean daily, in mg/l	N/A	All	Oct-Sep	250
Cache Slough at City of Vallejo Intake ² -and/or-	C-19 SLCCH16	Chloride (Cl-)	Maximum mean daily, in mg/l	N/A	All	Oct-Sep	250
Barker Sl. at North Bay Aqueduct Intake	- SLBAR3	Chloride (Cl-)	Maximum mean daily, in mg/l	N/A	All	Oct-Sep	250

B) AGRICULTURAL USES BY AREA

1) WESTERN DELTA

LOCATION	SAMPLING SITE NOs. (I-A/B/K)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
Salinity:							
Sacramento River at Emmaton	D-22 RSAC092	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily, in mmhos/cm ²	Sac. R.	W AN BN D C	0.45 EC April 1 to Date Shown Aug. 15	EC from Date Shown to Aug. 15 ³ -- 0.63 1.14 1.67 2.78
San Joaquin River at Jersey Point	D-15 RSAN018	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily, in mmhos/cm ²	Sac. R.	W AN BN D C	0.45 EC April 1 to Date Shown Aug. 15	EC from Date Shown to Aug. 15 ³ -- -- 0.74 1.35 2.20

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

B) AGRICULTURAL USES BY AREA (continued)

LOCATION	SAMPLING SITE NOs. (I-A/RKI)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
2) INTERIOR DELTA							
Salinity:							
South Fork Mokelumne River at Terminous	C-13 RSMKL08	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily, in mmhos/cm ²	Sac. R.		0.45 EC April 1 to Date Shown	EC from Date Shown to Aug. 15 ³
					W	Aug. 15	---
					AN	Aug. 15	---
					BN	Aug. 15	---
					D	Aug. 15	---
					C	---	0.54
San Joaquin River at San Andreas Landing	C-4 RSAN032	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily, in mmhos/cm ²	Sac. R.		0.45 EC April 1 to Date Shown	EC from Date Shown to Aug. 15 ³
					W	Aug. 15	---
					AN	Aug. 15	---
					BN	Aug. 15	---
					D	Jun. 25	0.58
					C	---	0.87
3) SOUTH DELTA							
Salinity:							
San Joaquin River at Airport Way Bridge, Vernalis	C-10 RSAN112	Total Dissolved Solids (TDS)	Mean monthly average, in mg/l	N/A	All	All year	500
<i>Stage 1 to be implemented upon adoption of this Order:</i>							
San Joaquin River at Airport Way Bridge, Vernalis	C-10 RSAN112	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC, in mmhos/cm ²	N/A	All	Apr 1-Aug 31	0.7
San Joaquin River at Brandt Bridge [site]	C-6 RSAN073					Sep 1-Mar 31	1.0
<i>Final stage to be implemented by December 31, 1996</i>							
San Joaquin River at Airport Way Bridge, Vernalis	C-10 RSAN112	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC, in mmhos/cm ²	N/A	All	Apr 1-Aug 31	0.7
Old River near Middle River	C-8 ROLD69					Sep 1-Mar 31	1.0
Old River at Tracy Road Bridge	P-12 ROLD59						
San Joaquin River at Brandt Bridge [site]	C-6 RSAN073						
or If a three-party contract has been implemented among DWR, USBR, and the SDWA, that contract will be reviewed prior to implementation of the above, and, after also considering the needs of other beneficial uses, revisions will be made to the objectives and compliance/monitoring locations noted above, as appropriate.							

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

B) AGRICULTURAL USES BY AREA (continued)

LOCATION	SAMPLING SITE NOs. (I-A/RKI)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
4) EXPORT							
Salinity: West Canal at mouth of Clifton Court Forebay & Delta Mendota Canal at Tracy Pumping Plant	C-9 CHWST0 DMC-1 CHDMC004	Electrical Conductivity (EC)	Maximum monthly average of mean daily, in mmhos/cm ²	N/A	All	Oct - Sep	1.0

C) FISH AND WILDLIFE BY HABITAT/SPECIES

CHINOOK SALMON

Dissolved Oxygen: San Joaquin River between Turner Cut & Stockton	RSAN050- RSAN061	Dissolved oxygen (DO)	Minimum dissolved oxygen, in mg/l	N/A	All	Sep 1 - Nov 30	6.0
Temperature: Sacramento River at Freeport -and- San Joaquin River at Airport Way Bridge, Vernalis	RSAC155 C-10 RSAN112	Temperature, in °F	The daily average water temperature shall not be elevated by controllable factors ⁴ above 68°F in the reach from the I Street Bridge to Freeport on the Sacramento River and at Vernalis on the San Joaquin River.	N/A	All	Apr 1 - Jun 30 Sep 1 - Nov 30	
Sacramento River at Freeport	RSAC155	Temperature, in °F	The daily average water temperature shall not be elevated by controllable factors ⁴ above 66°F in the reach from the I Street Bridge to Freeport on the Sacramento River.	N/A	All	Jan 1 - March 31	
Flow: San Joaquin River at Airport Way Bridge, Vernalis	C-10 RSAN112	Flow Rate (Total annual maximum of 150 TAF for the two salmon flows from the San Joaquin Basin reservoirs.)	Minimum daily flow, in cfs, for 21-day continuous period. Start date depends upon beginning of chinook salmon smolt out - migration from San Joaquin Basin	S-J R. ⁵	W AN BN D C	Apr 20 - May 10 ⁶ " " " "	10,000 8000 6000 4000 2000
			During this time, water right holders on Mokelumne & Calaveras rivers shall bypass all inflows for 5 consecutive days.				
			Daily mean combined export pumping by the Tracy, Banks, and Contra Costa pumping plants shall be ≤1500 cfs. All pumping restrictions are to be split equally between the CVP and the SWP.				
			Minimum daily flow, in cfs, for 14-day continuous period. Start date depends upon beginning of chinook salmon adult spawning migration. Attraction flow shall be provided only if water is available from the 150 TAF allotted for the two salmon flows.	N/A	All	Oct 18 - 31 ⁶	≥ 2000
			During this time, water right holders on Mokelumne & Calaveras rivers shall bypass all inflows for 5 consecutive days.				

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

C) FISH AND WILDLIFE BY HABITAT/SPECIES (continued)

LOCATION	SAMPLING SITE NOs. (I-A/RKI)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
CHINOOK SALMON (continued)							
Flow (continued):							
Sacramento River at Freeport	RSAC155	Flow Rate	Minimum daily flow, in cfs, for 14-day continuous period.	N/A	All	Apr 20 – May 4 ⁶	≥ 18,000
Sacramento River at Rio Vista	D-24	Flow Rate	14-day running average of minimum daily flow, in cfs	Sac. R.		Feb 1 – Mar 16 – Jan Mar 15 Jun 30	
						W 2500 3000 5000 AN 2500 2500 3000 BN 2500 2500 3000 D 1500 2500 2500 C 1500 2000 2000	
						Sep 1 – Jul Aug Dec 31	
						W 3000 1000 5000 AN 2000 1000 2500 BN 2000 1000 2500 D 1000 1000 1500 C 1000 1000 1500	
STRIPED BASS: 1. ANTIOCH – SPAWNING							
Salinity: San Joaquin River at Antioch Water Works Intake	D-12 (near) RSAN007	Electrical Conductivity (EC)	14-day running average of mean daily for the period not more than value shown, in mmhos/cm ²	N/A	All	Apr 15 – May 31 (or until spawning has ended)	1.5
Flow: Sacramento River at Chipps Island	D-10 RSAC075	Delta outflow index (DOI)	Average for the period not less than the value shown, in cfs.	N/A	All	Apr 1 – 14	6700
STRIPED BASS: 2. ANTIOCH – SPAWNING – RELAXATION PROVISION							
Salinity: San Joaquin River at Antioch Water Works Intake	D-12 (near) RSAN007	Electrical Conductivity (EC)	14-day running average of mean daily EC in mmhos/cm ² , not more than value shown corresponding to deficiencies in firm supplies declared by the CVP and SWP ⁷	Sac. R.		Apr 1 – May 31 Dry Critical	
This relaxation provision replaces the above Antioch and Chipps Island standards whenever the representative projects impose deficiencies in firm supplies.			Linear interpolation is to be used to determine values between those shown.	0.0 0.5 1.0 1.5 ≥ 2.0		1.5 1.8 1.8 1.8 1.8	1.5 1.9 2.5 3.4 3.7
STRIPED BASS: 3. PRISONERS POINT – SPAWNING							
Salinity: San Joaquin River at Prisoners Point	D-29 RSAN038	Electrical Conductivity (EC)	14-day running average of mean daily for the period not more than value shown, in mmhos/cm ²	Sac. R.	All	Apr 1 – May 31 (or until spawning has ended)	0.44

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

C) FISH AND WILDLIFE BY HABITAT/SPECIES (continued)

LOCATION	SAMPLING SITE NOS. (I-A/RKI)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
STRIPED BASS: 4. PRISONERS POINT- SPAWNING- RELAXATION PROVISION							
Salinity: San Joaquin River at Prisoners Point	D-29 RSAN038	Electrical Conductivity (EC)	14-day running average of mean daily for the period not more than value shown, in mmhos/cm ² . This replaces the above Prisoners Point standard when the relaxation provision for Antioch spawning protection is in effect:	Sac. R.	D & C	Apr 1-May 31 (or until spawning has ended)	0.55
STRIPED BASS: 5. GENERAL							
Flow: Sacramento River at Freeport	RSAC155	Flow Rate	For a 42-day continuous period, exact starting date to be dependent upon detection of striped bass eggs and larvae, flow, in cfs, shall be as follows:	N/A	All	April 16 - May 31 ⁶	14-day running average and minimum mean daily flow ≥ 13,000
Sacramento River at Chipps Island	D-10 RSAC075	Delta outflow index (DOI)	Average for the period not less than the value shown, in cfs.	Sac. R.	W AN BN D C	May 6-31 Jun Jul	14000 14000 10000 14000 9500 6500 11400 9500 6500 4300 3600 3200 3300 3100 2900
FISHERIES HABITAT							
Protection from entrainment for young fish: Mallard Slough		Electrical conductivity (EC)	14-day running average of EC, in mmhos/cm ²	N/A	All	July 1 - 31 ≤ 3.0	Aug 1 - Jan 31 ≤ 3.0
-or- Reverse flow in western Delta (QWEST), in effect if EC at Mallard Slough > 3.0		QWEST, as calculated in DAYFLOW	14-day running average of QWEST, in cfs	N/A	All	July 1 - 31 ≥ -1000	Aug 1 - Jan 31 ≥ -2000
Flow: Reverse flow in western Delta (QWEST)		QWEST, as calculated in DAYFLOW	14-day running average of QWEST, in cfs. Simultaneously, 7-day running average, if negative, shall be withing 1000 cfs of the applicable 14-day running average.	Sac. R.	W AN BN D C	February 1 - June 30	July 1 - July 31 ≥ -1000 ≥ -1000 ≥ -1000 ≥ -1000 ≥ -1000
Relaxation provision - Reverse flow standards in western Delta do not apply when the combined total CVP & SWP exports drop below 2000 cfs.		QWEST, as calculated in DAYFLOW	14-day running average of QWEST, in cfs. Simultaneously, 7-day running average, if negative, shall be withing 1000 cfs of the applicable 14-day running average.	Sac. R.	D C	Feb 1 - Mar 31	Apr 1 - Jun 30 Jul 1 - Jul 31 ≥ -1000 ≥ -1000

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

C) FISH AND WILDLIFE BY HABITAT/SPECIES (continued)

LOCATION	SAMPLING SITE NOs. (I-A/RKI)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES	
SUISUN MARSH								
Salinity:								
Sacramento River at Collinsville	C-2 RSAC081	Electrical conductivity (EC)	Monthly average of both daily high tide values not to exceed the values shown, in mmhos/cm ² (or demonstrate that equivalent or better protection will be provided at the location).	N/A	All by	Oct	19.0	
						Oct 1,1988	Nov	15.5
							Dec	15.5
Montezuma Slough at National Steel	S-64 SLMZU25	Electrical conductivity (EC)				All by	Jan	12.5
						Oct 1,1988	Feb	8.0
							Mar	8.0
Montezuma Slough near Beldon's Landing	S-49 SLMZU11	Electrical conductivity (EC)			All by	Apr	11.0	
					Oct 1,1988	May	11.0	
Chadbourne Slough at Chadbourne Road	S-21 SLCBN1	Electrical conductivity (EC)			All by			
					Oct 1,1993			
Cordelia Slough at Cordelia - Goodyear Ditch	S-97 SLCRD06	Electrical conductivity (EC)			All by			
					Oct 1,1993			
Goodyear Slough, 1.3 mile S of Morrow Island [Drainage] Ditch at Pierce	S-75 SLGYR04	Electrical conductivity (EC)			All by			
					Oct 1,1994			
Suisun Slough, 300 ft south of Volanti Slough	S-42 SLSUS12	Electrical conductivity (EC)			All by			
					Oct 1,1997			
Water Supply Intakes for Waterfowl Management Areas on Van Sickle and Chipps Islands		Electrical conductivity (EC)						
Flow:								
Sacramento River at Chipps Island	D-10 RSAC075	Delta outflow index (DOI)	Average of daily DOI for each month, not less than value shown, in cfs	Sac. R.	W	Feb - May	10000	
			Minimum daily DOI for 60 consecutive days in the period, in cfs	Sac. R.	AN	Jan - Apr	12000	
					BN	Jan - Apr	12000	
			Average of daily DOI for each month, not less than value shown, in cfs; applies whenever storage is at or above minimum level in flood control reservation envelope at 2 of the following - Shasta Reservoir, Oroville Reservoir, and CVP storage on the American River.	N/A	All	Jan - May	6600	
							(if greater flow not required by other standards)	
OPERATIONAL REQUIREMENTS								
Flow:								
Harvey O. Banks Pumping Plant (SWP), Tracy Pumping Plant (CVP), and Contra Costa Pumping Plant (CVP)		Combined export rate	Maximum combined 14-day running average export rate, in cfs, not to exceed the value shown. April & May 14-day running average based only on those days not included in the 1500 cfs restriction period. All reductions in exports to be equally shared between the CVP & SWP.	Sac. R.				
					W	April	6000	
					W	May	6000	
					W	June	6000	
					W	July	9200	
					AN	6000	6000	
					AN	6000	6000	
					AN	6000	6000	
					D	4000	4000	
					D	4000	4000	
					D	4000	4000	
					C	4000	4000	
					C	4000	4000	

TABLE II: DECISION 1630 WATER QUALITY OBJECTIVES AND FLOW REQUIREMENTS (continued)

C) FISH AND WILDLIFE BY HABITAT/SPECIES (continued)

LOCATION	SAMPLING SITE NOS. (I-A/R/K)	PARAMETER	DESCRIPTION	INDEX TYPE	YEAR TYPE	DATES	VALUES
OPERATIONAL REQUIREMENTS (continued)							
Flow (continued): Sacramento River at Chipps Island	D-10 RSAC075	Delta outflow index (DOI)	All export pumping restrictions are removed whenever DOI \geq 50,000 cfs except during April-May and October pulse flow periods.				
Other: Delta Cross-Channel at Walnut Grove		Closure of gates	Gates closed whenever daily DOI > 12000 cfs	N/A	All	January 1 - 31	
			Gates operated at the direction of the Executive Director of the State Water Board.	N/A	All	February 1 - June 30	

FOOTNOTES

1. Sac. R.: Sacramento Valley Water Year Hydrologic Classification -- described on following sheet.
2. The Cache Slough objective to be effective only when water is being diverted from this location.
3. When no date is shown, EC limit continues from April 1.
4. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board, or the Regional Water Quality Control Boards, and that may be reasonably controlled. Based on the record in these proceedings, controlling temperature in the Delta utilizing reservoir releases does not appear to be reasonable, due to the distance of the Delta downstream of reservoirs and uncontrollable factors such as ambient air temperature, water temperatures in the reservoir releases, etc. For these reasons, the State Water Board considers reservoir releases to control water temperatures in the Delta a waste of water; therefore, the State Water Board will require a test of reasonableness before considering reservoir releases for such a purpose.
5. S-J R.: San Joaquin Valley Water Year Hydrologic Classification -- described on following sheet.
6. The effective dates of the pulse flow period will be set each year by the Executive Director of the State Water Board after conferring with the DFG, the United States Fish & Wildlife Service (USFWS), DWR and USBR, whichever agency(ies) is(are) appropriate.
7. For the purpose of this provision, firm supplies of the Bureau shall be any water the Bureau is legally obligated to deliver under any CVP contract of 10 years or more duration, excluding the Friant Division of the CVP, subject only to dry and critical year deficiencies. Firm supplies of the Department shall be any water the Department would have delivered under Table A entitlements of water supply contracts and under prior right settlements had deficiencies not been imposed in that dry or critical year.

TABLE II
Sacramento Valley
Water Year Hydrologic Classification

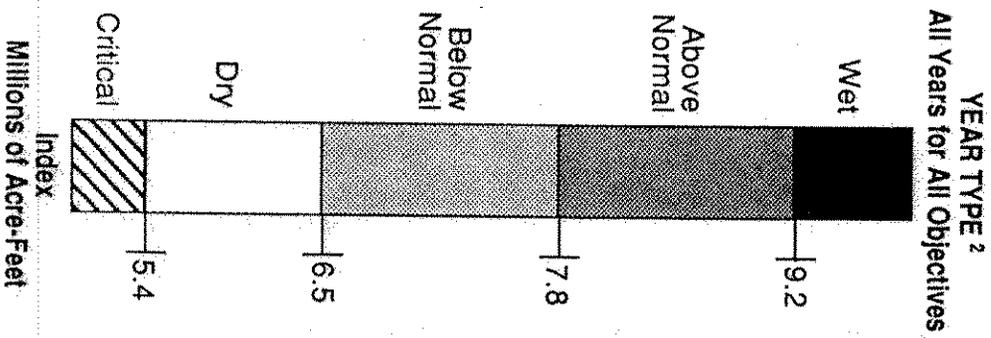
Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.4 * X + 0.3 * Y + 0.3 * Z$$

Where: X = Current years April – July
 Sacramento Valley unimpaired runoff
 Y = Current October – March
 Sacramento Valley unimpaired runoff
 Z = Previous years index ¹

The Sacramento Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year) as published in California Department of Water Resources Bulletin 120 is a forecast of the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

Classification	Index Millions of Acre-Feet
Wet.....	Equal to or greater than 9.2
Above Normal.....	Greater than 7.8 and less than 9.2
Below Normal.....	Equal to or less than 7.8 and greater than 6.5
Dry.....	Equal to or less than 6.5 and greater than 5.4
Critical.....	Equal to or less than 5.4



¹ A cap of 10.0 MAF is put on the previous years index (Z) to account for required flood control reservoir releases during wet years.

² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

TABLE II
San Joaquin Valley
Water Year Hydrologic Classification

Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.6 * X + 0.2 * Y + 0.2 * Z$$

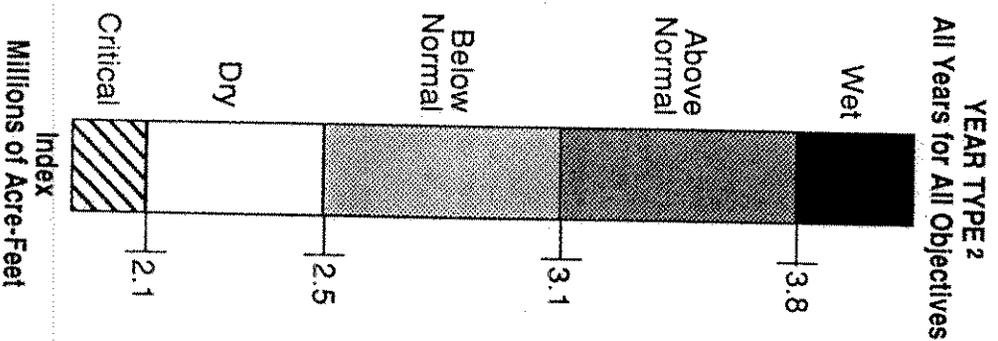
Where: X = Current years April – July
 San Joaquin Valley unimpaired runoff

Y = Current October – March
 San Joaquin Valley unimpaired runoff

Z = Previous years index ¹

The San Joaquin Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year) as published in California Department of Water Resources Bulletin 120 is a forecast of the sum of the following locations: Stanislaus River, total flow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total flow to Exchequer Reservoir; San Joaquin River, total inflow to Millerton Lake. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

Classification	Index Millions of Acre-Feet
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1 and less than 3.8
Below Normal	Equal to or less than 3.1 and greater than 2.5
Dry	Equal to or less than 2.5 and greater than 2.1
Critical	Equal to or less than 2.1



¹ A cap of 0.9 MAF is placed on the previous years index (Z) to account for required flood control reservoir releases during wet years.

² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

TABLE IV

RESPONSIBILITY FOR PULSE FLOW REQUIREMENTS IN THE SACRAMENTO BASIN

ENCLOSURE 2: MAJOR WATER USERS
BY TRIBUTARY FOR ALL WATER RIGHTS

TRIBUTARY	TRIBUTARY UIF TO BASIN UIF (%)	OWNER	RESERVOIR CAPACITY (AF)	% RESPONSIBILITY BY TRIBUTARY ¹ (%)
FEATHER	24.6	OROVILLE/WYANDOTTE	163,920	3.08
		DWR	3,764,197	70.75
		YUBA CO & OWI	93,643	1.76
		PG & E	1,298,466	24.41
YUBA RIVER	12.9	NEVADA ID	5,320,226	
		PG & E	212,850	15.37
		YUBA CO WA	140,536	10.15
BEAR RIVER	1.8	NEVADA ID	1,031,674	74.49
		SOUTH SUTTER WD	1,385,060	
AMERICAN	14.7	NEVADA ID	75,270	42.22
		SOUTH SUTTER WD	103,000	57.78
		ACTO	178,270	
		PLACER CO WD	83,745	5.71
SACRAMENTO	46.0	PG & E	344,037	23.44
		USBR	13,317	0.91
		USBR	1,026,400	69.94
TOTALS	100		12,936,675	

¹ PERCENTAGE IS DETERMINED BY DIVIDING OWNER'S RESERVOIR CAPACITY BY TOTAL TRIBUTARY RESERVOIR CAPACITY

TABLE V

RESPONSIBILITY FOR PULSE FLOW REQUIREMENTS IN THE SAN JOAQUIN BASIN

ENCLOSURE 2 MAJOR WATER USERS BY TRIBUTARY FOR ALL WATER RIGHTS				
TRIBUTARY	TRIBUTARY UIF TO BASIN UIF ¹ (%)	OWNER	RESERVOIR CAPACITIES (AF)	% RESPONSIBILITY BY TRIBUTARY ² (%)
STANISLAUS	28.7	PG&E	33,864	1.19
		CALAVERAS COUNTY W.D.	185,025	6.49
		OAKDALE & S. SAN JOAQUIN	231,920	8.14
		USBR	2,400,000	84.19
TUOLUMNE	46.7	TID/MID	2,850,809	85.45
		SFRISCO	2,119,500	14.55
			361,020	
MERCED	24.6	MERCED IRRIGATION DIST	2,480,520	
			1,041,650	100.00
TOTALS	100		1,041,650	
			6,372,979	

¹ BASIN UNIMPAIRED FLOW IS THE SUM OF THE TABLE'S THREE TRIBUTARY UNIMPAIRED FLOWS

² PERCENTAGE IS DETERMINED BY DIVIDING OWNER'S RESERVOIR CAPACITY BY TOTAL TRIBUTARY RESERVOIR CAPACITY

what of USBR on The San Joaquin?